



Actuarial School Program Assessment  
Federation of Bosnia and Herzegovina

**Assessment of the Actuarial School Program in the  
Federation of Bosnia and Herzegovina**

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## Actuarial School Program Assessment Federation of Bosnia and Herzegovina

### **TABLE OF CONTENTS**

<b>1. Executive summary</b>	<b>3</b>
<b>2. Terms of reference and material considered</b>	<b>4</b>
<b>3. The current programme</b>	<b>4</b>
<b>4. Compliance with international standards and recommendations for improvement</b>	<b>6</b>
<b>5. Conclusion</b>	<b>9</b>

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### **Volunteer**

At the request of the Financial Services Volunteer Corps (FSVC), an assessment was made of the actuarial school program by an advisor during spring 2004. Mr. Graham Luffrum is currently a part-time lecturer at the University of Economics in Bratislava. He is a Fellow of the Institute of Actuaries and has 19 years of experience of training actuaries in the UK and in Central and Eastern Europe.



## Actuarial School Program Assessment Federation of Bosnia and Herzegovina

### 1. Executive summary

The writer has been asked to carry out a review of, and put together a commentary on, the actuarial certification programme offered in the Federation of Bosnia-Herzegovina, hereafter referred to as the “actuarial programme”.

As a base for actuarial education, the current programme, basic and advanced parts combined, represents a good start and its authors are to be complemented on what they have so far achieved. The content is not, however, fully up to international standards and the emphasis of the basic part seems to be too oriented to the demands of the insurance supervisor. A number of Modules would not usually find a place in main-stream actuarial education and it is recommended that these be made compulsory only for those seeking to acquire authorisation.

The examination procedures for the basic part of the actuarial programme allow for either oral or written examinations or a mixture of both. It is not usual for an actuarial programme to be examined using oral examinations, although they may have a place as part of a final assessment of the ability of a student to become a full member of an actuarial association. The advanced part is to be examined by written examinations. It is recommended that all the Modules be so examined.

The reading materials for many of the Modules of the basic part of the actuarial programme consist of university and other texts published in the former Yugoslavia. As part of the recommendation later to align better the content of the programme with international standards, it is recommended that replacements be found for these texts.

As already stated, the content of the programme is not up to international standards. As the international standard for actuarial education, the author of this report has used the Core Syllabus for Actuarial Training in Europe, published by the Groupe Consultatif Actuariel Européen in May 2002 (hereafter referred to as the “Groupe Syllabus”).

The failings in the main relate to those Modules where the suggested reading is of local origin. It is recommended that the content of these Modules be aligned with that of the corresponding subjects in the Core Syllabus of the Groupe Consultatif. It will then be necessary to find suitable texts to accompany the revised versions. Of necessity it is likely that these will be in English or possibly German, but in any case it is arguable that in the modern financial world it is highly desirable that future actuaries be sufficiently fluent in another language so that they can read actuarial and other related texts in that language.

Teaching of the subjects in the programme is provided by an Actuarial School established by the Actuarial Association in Sarajevo. Many of the teachers are from universities, but use is also made of practitioners. It is understood that the credibility of the programme has been questioned because of the fact that the School is not linked to a university. This does not in reality denigrate the value of any certificate obtained, certainly not at the international level. In many countries, including the USA and the UK, there is no such link and the value of actuarial certificates obtained there is not questioned. The problem here is a cultural one and not an actuarial one.

Having said this, it would be desirable, from the point of view of the long-term viability of an actuarial training programme in Bosnia-Herzegovina, for it to be based in a university, as a post-graduate diploma course. Given the potential demand for actuaries such a course might be viable only once every three or five years. It is important, however, not to take too narrow



## Actuarial School Program Assessment Federation of Bosnia and Herzegovina

a view of the purpose of actuarial education. The graduates of a properly planned post-graduate course should be able to find employment in the wider financial market and not just in the area of insurance. This would significantly increase the course's attraction and hence the potential interest of participants.

### **2. Terms of reference and material considered**

The terms of reference for this project are:

- Evaluate the programme curriculum (basic and advanced course modules), programme examination procedures and reading materials;
- Review and evaluate the current programme's compliance with international standards;
- Identify any weaknesses in the actuarial programme and recommend how to remedy these in order to align the programme with international standards.

These terms of reference have been interpreted as requiring an assessment from an actuarial profession point of view. The requirements of an insurance supervisor with regard to actuarial education have not as such been considered. It is, however, the writer's opinion that the contents of the actuarial programme after implementing the recommendations contained in this report would be such as to permit authorisation.

The material supplied by FSVC and considered in the preparation of this report is as follows:

- School For an Authorised Actuary – a document put together by the Sarajevo Actuarial Association
- A 3-page addendum to the above document with corrections to two basic modules and literature
- Plan and Program of Actuarial Education
- Annex 6.2—Calculation of Mathematical Reserves
- Annex 6.1—Calculation of Technical Provisions
- Annex 7.1—Insurance Investments
- Annex 11—Life Insurance Linked to Investment and Tontines

In addition reference has been made to the Core Syllabus of the Groupe Consultatif Actuariel Européen.

### **3. The current programme**

The current programme, according to the documentation supplied, consists of a basic course made up of 12 Modules together with two additional preliminary Modules for those without an adequate pre-knowledge of basic economics and mathematics respectively. This course is required for someone wishing to become an authorised actuary in accordance with the insurance legislation. In addition there is an advanced course planned which consists of four components.

The titles and numbering of the Modules in the basic course are shown in the table below.



## Actuarial School Program Assessment Federation of Bosnia and Herzegovina

Apart from the first two Modules, the titles are specified in the insurance regulations relating to acquiring authorisation to carry out supervisory actuarial duties, with the detailed content being delegated to the actuarial association, subject to its final approval by the insurance supervisor. In all cases the most recent version of the content, as supplied to the writer, has been considered.

<b>Modules of the Actuarial Programme</b>	
<b>Title</b>	<b>Module number(s)</b>
Mathematics	00
Basics of economics	01
Basics of life and non-life insurance and re-insurance	10
Insurance economics	20
Accounting	30
Life contingencies	40
Statistics	50 & 51
Insurance statistics	60
Financial mathematics and models of finance	70 & 71
Actuarial mathematics	80 & 81
Insurance law	90

A number of these Modules would not normally find a place in actuarial education – Modules 10, 20, 60 and 90 – at least to the extent that they are covered here. The presence of these Modules, and in particular the depth to which they are covered, is presumably considered necessary by the insurance supervisor. It does, however, make the programme much less attractive to someone wanting to make use of actuarial skills in the financial market outside of insurance.

A compromise would be to make these Modules optional, except for those who wish to acquire authorisation.

The reading for Modules 00, 30, 50, 70 and 80 consists of university and other texts published in Bosnia-Herzegovina, Croatia and in one case Serbia. Many of these texts appeared before the collapse of the socialist system in the former Yugoslavia. This reading material is not known to the writer and therefore it has not been possible to consider its suitability. However, it is not unreasonable to question whether texts dating from the socialist period are still suitable.

It has also not been possible to determine whether the content of these Modules has been derived so as to fit the reading material. The contents of Modules 70 and 80 in particular feel old-fashioned and this may be as a result of using texts dating from 1967, 1972, 1978 and 1985.

As a general point, it is necessary to emphasise that in syllabus development, the starting point is the content and then suitable literature is found and not the other way round.

The content of Modules 51, 71 and 81 has been taken almost directly from the equivalent subjects in the Groupe Syllabus and the reading material similarly.

The remaining two Modules – 01 and 40 – make use of modern texts mostly in English and their content is up-to-date.



## Actuarial School Program Assessment Federation of Bosnia and Herzegovina

The advanced course, according to the draft document which was going to be discussed within the School management, consists of four Modules:

- Module 11 – Life insurance
- Module 12 – Non-life insurance
- Module 13 – Pension insurance
- Module 14 – Health insurance

The content of these Modules is taken from the equivalent subjects in the Groupe Syllabus and most of the literature similarly.

The method of examining the Modules in the basic course is specified in a set of Rules adopted by the actuarial association. These state that the examination

“Includes: a) oral examination, b) written examination, c) oral and written examination, and the examination form for each subject is defined by the agreement of the School Director and the School Management.”

The use of oral examinations in actuarial education programmes is unusual. They are not used at all in North America and in the United Kingdom, although consideration is being given to their possible use in the UK at the end of the education process for assessing whether someone is suitable to become a full member of the actuarial association. In Europe they are used in universities as part of the final examinations before graduation and hence can also arise in university-based actuarial programmes, but not as the regular way of examining actuarial subjects.

The proposed plan for the advanced course specifies that the Modules for that course will be examined using written examinations, each lasting at least three hours. It is recommended that the examinations for the basic course should also be of this form.

These could contain either multiple-choice type questions or written answer type questions or a mixture of both according to the nature of the subject. There is no international standard in this respect. In North America, and to a lesser extent in the United Kingdom, use is made of multiple-choice type questions in combination with written answer type questions for the more basic subjects. In other countries written answer type questions are more common.

#### **4. Compliance with international standards and recommendations for improvement**

At the present time, there are two international standards in respect of actuarial education: the Core Syllabus of the Groupe Consultatif Actuariel Européen and the education guidelines prepared by the International Actuarial Association. The latter are less extensive and less detailed than the former and essentially form a sub-set. Compliance will, therefore, be considered against the Groupe Syllabus.

Moreover, it would appear from the material supplied that the actuarial association have in mind applying for membership of the Groupe and become part of its mutual recognition agreement, thus ensuring a European-level qualification for its members. One of the conditions of membership of the Groupe is that the association's education programme complies with the Groupe Syllabus.



## Actuarial School Program Assessment Federation of Bosnia and Herzegovina

A detailed comparison has been made between the contents of the actuarial programme and the contents of the Groupe Syllabus.

The Groupe Syllabus consists of 18 subjects divided into three stages as shown in the following table.

There is also a fourth stage, referred to as Stage 3. This is not compulsory for the purpose of mutual recognition and is not relevant for the actuarial profession in Bosnia-Herzegovina at its current stage of development.

Contents of Groupe Syllabus	
Stage 0	Preliminary stage
1.	Mathematics
2.	Probability and statistics
3.	Stochastic processes
4.	Computing
5.	Economics
6.	Accounting and financial reports
7.	Structures and legislative instruments of the EU
8.	Communication skills
9.	Language skills
Stage 1	Actuarial foundation stage
10.	Financial mathematics
11.	Survival models
12.	Actuarial mathematics
13.	Risk mathematics
14.	Investment
Stage 2	Generalised applications stage
15.	Life insurance
16.	General insurance
17.	Pensions
18.	Living benefits

Subjects 7 and 9 are not compulsory and do not need to be assessed, except as noted below they are not covered by the actuarial programme. A further two – subjects 4 and 8 – are compulsory, but are not required to be assessed. These also are not covered by the actuarial programme. The remaining 14 are contained within the actuarial programme, but the degree of compliance is mixed.

A detailed commentary including recommendations for improving compliance follows. (Module xx refers to the modules of the actuarial programme.)

Subject 1. It appears that Module 00 has been designed to correspond with this subject, but a number of topics are missing. In particular, measure theory, Fourier analysis and



## Actuarial School Program Assessment Federation of Bosnia and Herzegovina

numerical analysis should be there. It may be necessary to provide alternative or supplementary reading if that which is specified does not cover these topics.

- Subject 2. This is covered in Module 50, but with some gaps. In particular there is no coverage of decision theory and simulation. Again, it may be necessary to provide alternative or supplementary literature.
- Subject 3. This is covered by Module 51.
- Subject 4. This is not covered by the actuarial programme. It would, however, be expected that students applying to go on the programme would possess the required skills and the actuarial association should consider making this a pre-condition.
- Subject 5. This is covered in an acceptable form in Module 01.
- Subject 6. It would appear that Module 30 aims to cover this subject. It goes, however, into more detail than would usually be considered necessary in actuarial education. Also it is not clear that it covers taxation to the extent expected by the Groupe Syllabus. It is recommended that the content of Module 30 be re-assessed so that it includes at least what is in Subject 6. This may mean providing alternative or supplementary reading.
- Subject 7. This subject is not compulsory and if included in an actuarial course it does not need to be assessed. Module 90 covers insurance law in the EU, but the remaining topics are not covered. It is not known how well, if at all, this subject is covered within the EU countries and so no recommendation will be made as to whether it should be covered in the actuarial programme.
- Subject 8. This subject is compulsory, but does not need to be assessed formally. It is not covered in the actuarial programme. It is recommended that some reference be made in the programme to the requirement for actuaries to be able to communicate.
- Subject 9. This subject is neither compulsory nor needs to be assessed. The writer would expect that those seeking to become actuaries in a country like Bosnia-Herzegovina would in any case be able to communicate and read actuarial literature in another language.
- Subject 10. It would appear that Module 70 aims to cover this subject. As noted earlier the content of that Module appears old-fashioned and does not cover modern topics such as arbitrage and stochastic interest rate models. It is recommended that the content of Module 70 be re-examined so that it covers the topics of Subject 10. This will almost certainly mean using alternative reading.
- Subject 11. This together with Subject 12. are covered in Modules 40 and 80.
- Subject 12. See comment on Subject 11.
- Subject 13. This is covered by Module 81.
- Subject 14. This is covered by Module 71.





## Actuarial School Program Assessment Federation of Bosnia and Herzegovina

As noted earlier, Subjects 15 to 18 are matched by Modules 11 to 14 of the actuarial programme.

In a number of places it has been recommended that alternative or supplementary reading be found. No specific recommendations have been made, but suggestions for suitable reading can be found in the Groupe Syllabus.

### **5. Conclusion**

The existing actuarial programme is a good start. The content of a number of the Modules does not cover modern ideas and others are not fully in line with international standards. These Modules should be revisited, both as to content and to suggested reading, if the programme is to produce actuaries whose qualification will be recognised at the European level. The examination methods should also be changed so that all Modules are examined using written examinations.

In order to help ensure the long-term viability of actuarial education, the programme should take place within a university and be made such that it will attract all those who can make use of general actuarial skills in the wider financial market.